MUNICIPAL WATER SUPPLY ISSUES IN BRITISH COLUMBIA

Crippen Consultants
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ROUND TABLE

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PREFACE

"Municipal Water Supply Issues in British Columbia" was prepared by Crippen Consultants at the request of the British Columbia Round Table on the Environment and the Economy. It is part of a series of background reports dealing with issues which the Round Table considered important to the development of a sustainable development strategy for British Columbia. It is intended to provide information that will assist the dialogue between the Round Table and the public.

The Round Table has not endorsed the report. The information provided and conclusions reached in this document are those of the author.

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EXECUTIVE SUMMARY

Municipal Water Issues In British Columbia

This background report focuses on drinking water issues and concerns faced by communities. Major issues are related to the quantity and quality of water, and to management of the water resource.

Surface water from streams and lakes is the main supply of drinking water for most communities, and there are seasonal shortages in some areas of British Columbia. Groundwater is a potential solution to this problem, but it is currently unregulated under existing legislation and there are concerns about groundwater contamination. Water supply is seen as a limitation to development in a quarter of the Province's regional districts.

The report indicates that the majority of regional districts have concerns about logging in community watersheds. Recreational activities, and runoff and leaching from agricultural land and residential areas are also of concern. Only five communities take water treatment beyond chlorination, and potential contamination with Giardia may trigger expensive water treatment mechanisms. Water distribution systems also need high cost upgrading and expansion.

The report indicates that there is little watershed planning and that there is a lack of local input and authority.

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1.0 INTRODUCTION

The Round Table on the Environment and the Economy was formed January 16, 1990 to assist government in developing a sustainable development framework for the province of British Columbia. "Sustainable development is defined as ensuring that the utilization of resources and the environment today does not damage prospects for their use by future generations" (Province of British Columbia News Release, January 16, 1990). Identification of issues is the primary critical step to developing a strategy for sustainable development.

Water must be managed for development and for environmental sustainability. Water is a factor of economic activities, is an important ecosystem component, and is essential for basic survival. In British Columbia we have the luxury of expecting a turn of the tap to be followed by a supply of potable water to serve our daily activities. In most cases, demand is the only factor which affects the flow that reaches the household system. If we want water we have it; the amount used for domestic purposes is up to the individual. Can we always expect this to be the case?

Water is a renewable resource. It is recirculated through the process of rainfall, infiltration and groundwater recharge, overland flow and surface water supply, evaporation, transpiration and reintroduction as rainfall to complete the continuous hydrologic cycle. What are the limits to water availability? How are our activities affecting the picture for tomorrow's water supply? Are we managing water wisely? Are we aware of the factors which affect a secure clean water supply? What are the potential costs of water supply and how can we be sure that the health and welfare of the residents of British Columbia are protected both now and for the future? How can other demands on water and land within municipal watersheds be managed to achieve provincial economic and lifestyle objectives?

1.1 Goals

The goals of the Water Supply Issues Background paper are as follows:

- identify current problems facing managers and purveyors of domestic water supply for urban areas of British Columbia.

- identify environmental and economic concerns, and potential issues which relate to urban water supply in terms of quantity, quality and management for the long term.

2.0 THE SETTING

In a global context, British Columbia is envied for its plentiful supply of accessible water of exceptionally high quality. Does a closer look at the concerns facing municipal water purveyors and water managers substantiate this global perception? In order to appreciate the water supply issues facing the province it is necessary to first look at water resources generally within the provincial setting.

2.1 Precipitation

The spatial distribution of precipitation in British Columbia is largely a function of topography. Precipitation is partly governed by the presence of the Coast Mountains which resist the eastward movement of moisture laden clouds. Areas to the west of the coastal mountains receive over 100 cm of precipitation per year with some areas experiencing over 360 cm per year. East of the Coast Range, in the Interior Plateau, mean annual rainfall is generally less than 75 cm per year, with some areas around Kamloops and Osoyoos receiving less than 30 cm per year. Further east toward the Rocky Mountains and the British Columbia/Alberta border, a similar pattern occurs. Precipitation is highest west of the Rockies and less than 50 cm per year east of the Rockies. Figure 1 shows the mean annual precipitation in British Columbia.

British Columbia experiences seasonal variations in precipitation. In general, the area west of the Interior Plateau has maximum precipitation in the winter months. The north-east portion of the province experiences a summer maximum, while southeastern British Columbia has a relatively even distribution of precipitation throughout the year.

2.2 Surface Water

British Columbia has a plentiful supply of surface water in most regions. Streamflow hydrographs for major surface water sources are shown in Figure 2. It should be noted that good water quality is important when assessing the adequacy of surface water sources for domestic use.

Turbidity can result from natural conditions such as the nature and composition of both the stream channel and watershed. The Fraser and Skeena River systems vary considerably in turbidity from section to section. Along the main stem of the Fraser River between Quesnel and Williams Lake, summer turbidity is usually above the desirable limit for use in municipal water supply systems.

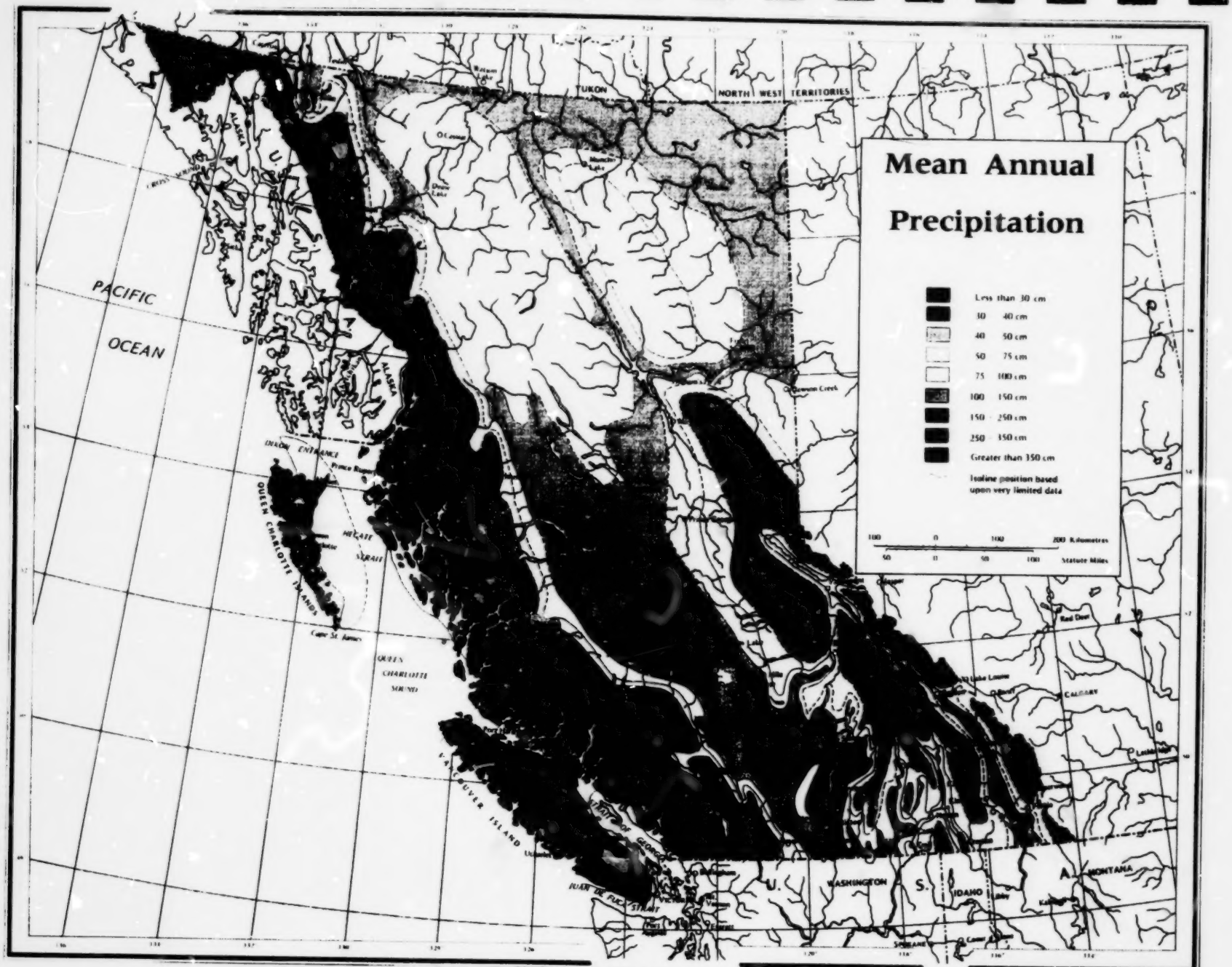

Figure 1: Mean Annual Precipitation

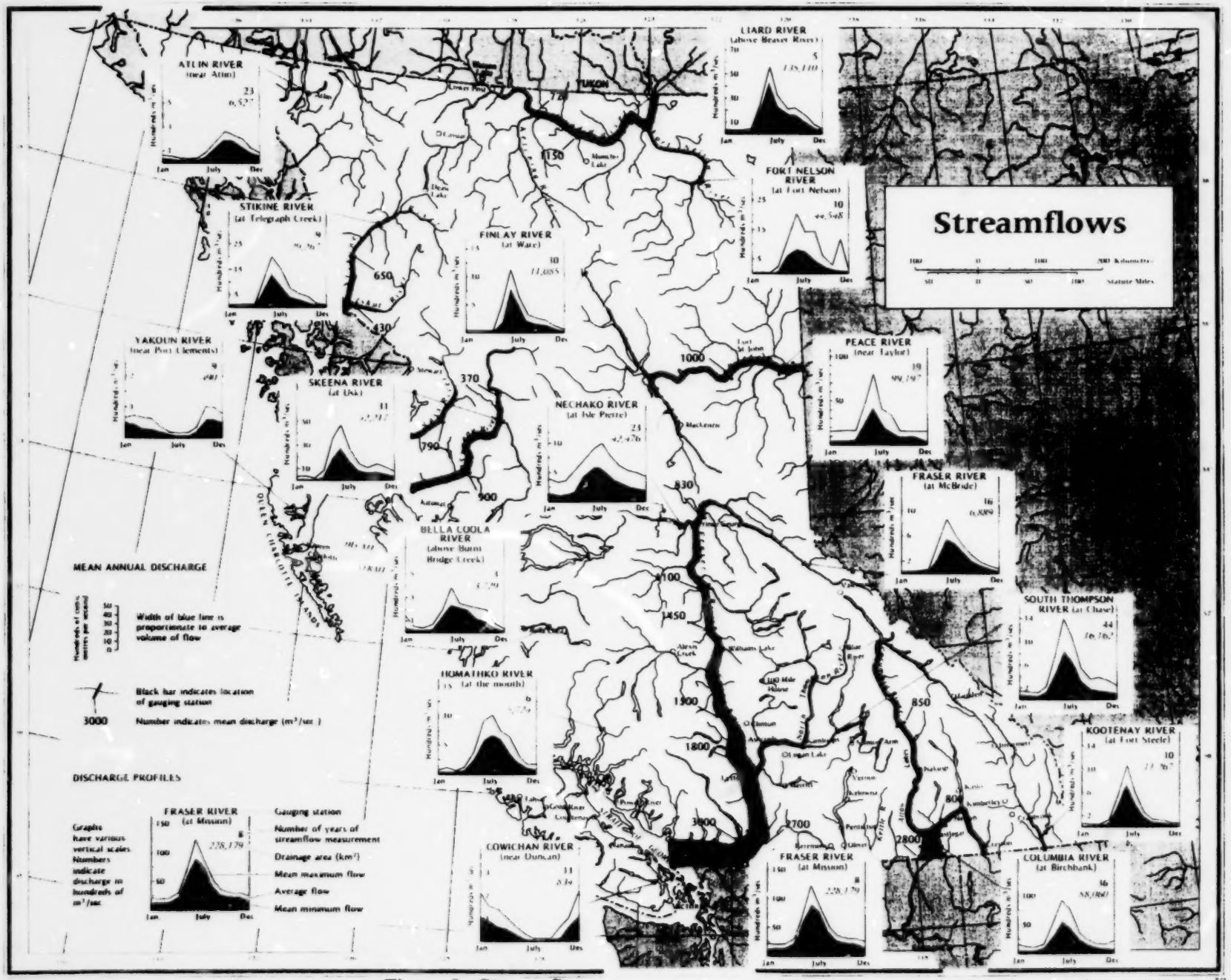

Figure 2: Stream flows
Source: A. Farley. 1979 Atlas of British Columbia, UBC Press

Water hardness is a result of natural conditions and varies throughout the province. The type of rock and soil surfaces, and the water contact time, affect the amount of dissolved solids, and thus the hardness. Streams associated with the Rocky Mountains carry relatively hard water, whereas the Skeena, the Fraser, and the coastal stream systems have soft water.

In addition to naturally occurring variability in water quality, human activities can seriously degrade the quality of water supplies. Discharges from municipal, industrial and agricultural wastes, and the impacts of land based activities in watersheds (forestry, mining) can alter natural water quality. The Okanagan River system is an example where phosphorus levels were considered a threat to water quality. Programs are in place to control phosphorus input to the Okanagan system including the use of specialized municipal waste water treatment facilities which remove phosphorus from waste water entering the Okanagan system.

2.3 Groundwater

Groundwater refers to water below the earth's surface which occupies the spaces between soil particles and within fractures in bedrock. Groundwater recharge is by infiltration of precipitation or by seepage from surface water sources. In many places in British Columbia, groundwater is an important water supply source. Major groundwater supplies are associated with course-textured surficial deposits, especially those found in river valleys. Figure 3 shows groundwater availability in British Columbia.

2.4 Water Use in British Columbia

Generally, British Columbians are blessed with a plentiful supply of clean water. Two-thirds of the water supplies of regional districts and municipalities are from surface water sources. Approximately one third of all water supplies are from large water bodies such as rivers and lakes. The remainder of surface water sources are creeks and streams.

Typically, water use in British Columbia tends to be higher in the summer than in winter, especially for domestic use and agriculture. Total water withdrawals for all uses in British Columbia was over 37 billion cubic meters in 1981 (Inquiry on Federal Water Policy, 1988). Municipal and residential withdrawals were less than 15% of the total. Most communities have ample supplies of water for predicted future development.

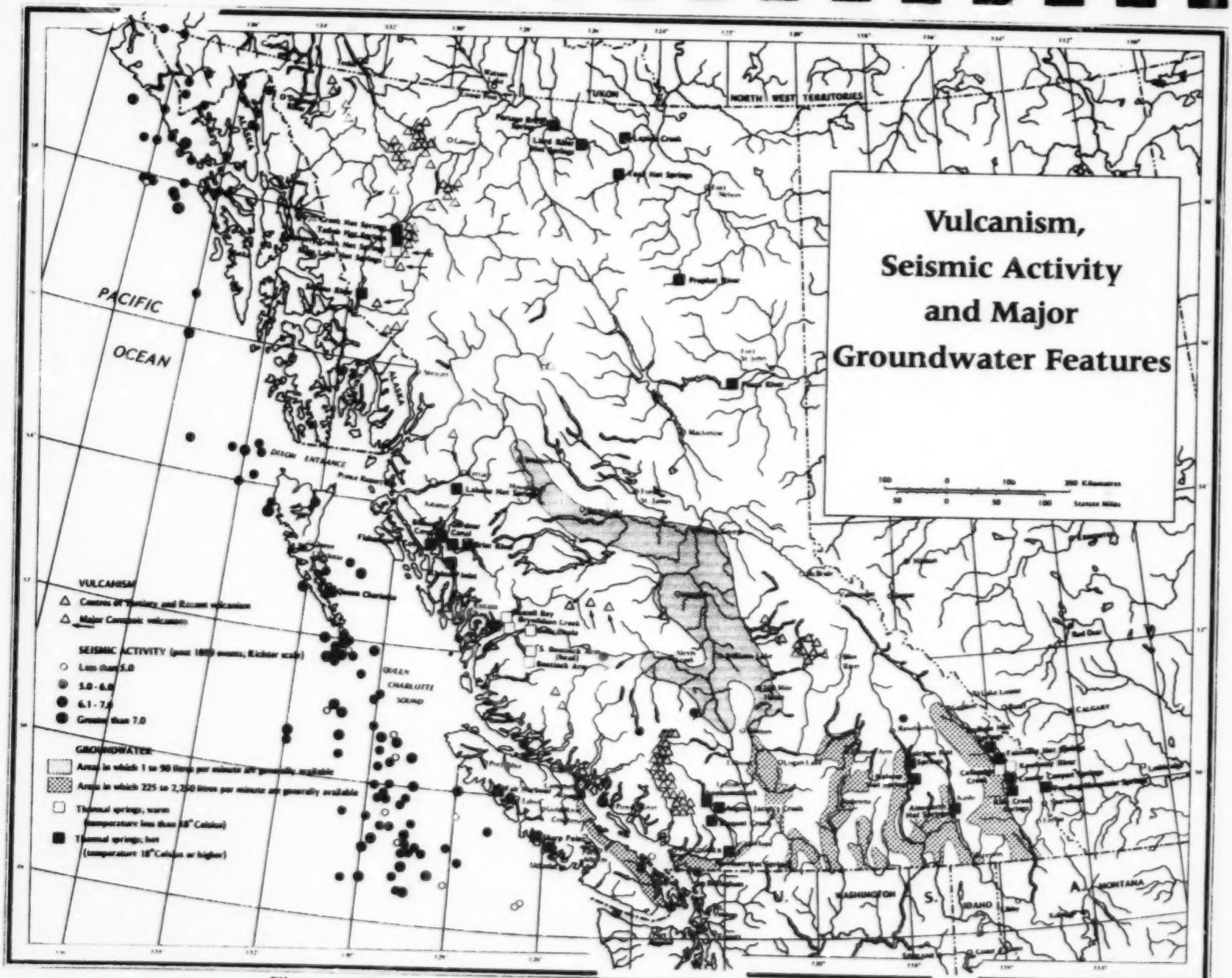

Figure 3: Vulcanism, Seismic Activity, and Major Groundwater Features
Source: A. Farley. 1979 Atlas of British Columbia, UBC Press

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3.0 IDENTIFICATION OF WATER ISSUES

3.1 Scope

The water supply background paper is focused on the concerns identified by regional districts and by municipalities defined as cities under the Municipal Act. In British Columbia there are 38 municipalities classified as cities.

Water supply for domestic use is primarily within the responsibility of the city. However, in some cases regional districts have assumed the role of water purveyor, to provide water both within and outside municipal boundaries. Not all regional districts have responsibilities as water purveyors. In British Columbia there are 29 regional districts of which 20 have some responsibility for water supply. The extent of responsibility is determined by each regional district's Board of Directors (British Columbia List, 1989).

3.2 Methods

The material presented in this background paper is based on telephone contact with engineers, planners, and public works superintendents for cities and regional districts. Additional contacts were made with staff from the Ministries of Environment and Health to develop a provincial perspective on water supply issues. These contacts add to the overall understanding of the provincial processes which are in place to protect urban water supplies and to maintain public health.

Telephone contact was attempted for all cities and regional districts within British Columbia. Successful contact was made with 61 key informants which includes representatives of 27 cities, 28 regional districts, and 6 provincial agencies.

4.0 WATER QUANTITY ISSUES

4.1 Lack of Water

In British Columbia, there are settled areas which lack water for one or more of the following reasons:

- seasonal increases in demand,
- reaching the limit of current surface water source, and/or
- depletion of aquifers.

Seasonal shortages occur in many areas of the province, including Peace-Liard, the Kootenays, Central Coast and the Sunshine Coast. In most cases, shortages occur in areas primarily dependent on surface water supplies. Supply could potentially be augmented by increasing storage on creeks, rivers or lakes. In several areas, surface water is augmented with groundwater during periods of shortage.

For several communities, there is an economic concern regarding the limits of their current surface water supply. The cost of developing additional supplies is a financial barrier, and could potentially affect settlement patterns in the future. In most cases, these communities do not have the population (and therefore, the tax base) to proceed with major capital improvements for new water intakes or storage.

In some areas of the province municipalities rely on groundwater sources for domestic supply. Potential depletion of aquifers through over use of groundwater sources was a concern primarily expressed by the regional districts of Bulkley-Nechako, Cowichan Valley, Fraser-Fort George, Nanaimo, and Okanagan-Similkameen.

4.2 Uncertainty of Supply

Uncertainty of groundwater supply is caused by a lack of information regarding water availability and by the lack of management of water withdrawals. Groundwater is a resource, which is difficult and expensive to map and monitor. There is concern over the lack of information regarding the extent of groundwater reserves, even in areas where communities are dependent on groundwater supply. Information is needed to ensure sustainable use of groundwater sources. Where information is available, the Ministry of Environment sometimes has difficulty responding to requests in a timely manner.

In British Columbia there is no groundwater allocation process. Uncertainty related to retention of current and future supplies for municipal use is therefore an issue. For example, on southern Vancouver Island (Cowichan Valley, Nanaimo) where populations are largely dependent on groundwater, private wells compete for water from aquifers currently used by municipalities. Regions where mining of aquifers has been identified as a concern are Bulkley-Nechako, Cariboo, Fraser-Cheam and Mount Waddington.

4.3 Inadequate Distribution Systems for Existing Demand

Eleven regional districts mentioned that inadequate distribution systems are the major impediment to water availability, rather than lack of water at the source. The cost associated with upgrading distribution systems is also a concern at the municipal level.

Generally the developer is required to cover the cost for water supply infrastructure needed for new subdivisions. Higher water rates are imposed where improvement to existing infrastructure is required, such as treatment plants or replacement of mains. This is an issue for smaller population centers where the burden of infrastructure improvements must be covered by a relatively small tax base. In these cases provincial funding is often sought.

4.4 Restrictions on Future Development

Water availability was cited as a future impediment to economic development by more than 25% of the regional districts. In most cases, this was related solely to the distribution systems rather than the amount of water available at source. In the Alberni-Clayoquot Regional District, the communities of Tofino and Ucluelet have both been restricted for development in the past by inadequate infrastructure. Both systems have been upgraded within the past 15 years, followed by periods of rapid growth. Both towns are now reaching the limits of current infrastructure, which may soon limit development once again.

In several site-specific areas, residential or industrial development may be limited by water supply shortages. For example, development in one area within the City of Prince George is limited, as are areas within the Powell River, Central Kootenay, and Kootenay-Boundary regional districts. In only one regional district, Peace River-Liard, is the shortage of water felt to be the major impediment to industrial development in the entire region. In this region, Dawson Creek trucks potable water to outlying communities. Residents pay $35 - $120 per truck load of potable water. The water shortage in this district required the Louisiana Pacific Pulp Mill project on the Peace River to develop a new system for recycling water.

4.5 Uncertainty of Long Term Demand

Regional and municipal managers in northern British Columbia face difficulties in predicting long-term demand for water due to the boom- and-bust resource economies typical of the area. Radical fluctuations in population (and tax base) are a challenge to planning. This is especially true for water supply systems which take time to construct and are highly capital-intensive.

4.6 Excessive Water Use

One interior population center reported water consumption, on a per capita basis, to be considerably higher than the provincial average. The excessive water demand was primarily attributed to watering lawns during dry, hot periods in the summer. The municipality was concerned that treated water was being used to make lawns green in a "desert" environment. Lawn watering is a major consumptive use burdening municipal water supply systems in many areas of British Columbia. This increased use of water often occurs when competing demands for water are high and when streamflow is reduced.

5.0 WATER QUALITY ISSUES

Water quality concerns were expressed regarding all aspects of quality: aesthetic (taste, appearance, smell), biological contamination, and chemical contamination. These can be categorized into a number of recurring "themes" revolving around activity in the watershed, threats to groundwater, and treatment and infrastructure.

5.1 Activity in Watersheds

Human activity within community watersheds is considered as a potential threat to water quality. Although the lack of human activity in community watersheds is not seen as an absolute guarantee of ensuring good water quality, human activity is perceived as potentially controllable and therefore an area where local government could have effective input regarding water quality management.

5.1.1 Logging

The majority (18 of 27) of regional districts and 8 of 27 municipalities are concerned that logging activities have affected water quality or will affect it in the future. Many regional districts have noted an increase in turbidity since the onset of logging. As an extreme example, the Sunshine Coast Regional District suspected that existing turbidity problems have resulted from poor logging practices in the past. A recent study in their watershed revealed that an environmentally sensitive slope, which was logged 15 years ago, has continued to erode since that time.

Where logging has degraded water quality, water managers and planners questioned the decision-making process regarding the economic benefits of logging. The costs of restoring water quality could potentially outweigh the economic benefits of logging.

5.1.2 Recreation

Four regional districts and five municipalities expressed concerns regarding uncontrolled recreation in community watersheds. These concerns are related to the potential for biological contamination of water sources and the current lack of water treatment plants necessary to protect against such contamination reaching the consumer. Giardia sp is currently the major biological contaminant of concern. It is a leading cause of water borne infection in western Canada. This illness is caused by protozoa and is characterised by gastroenteritis, diarrhea, and vomitting. Humans, domestic pets and wildlife, (such as beavers and deer) are potential carriers of this disease agent.

Giardia is generally detected only after members of the community are already infected. There is concern that this reactive method of detection is inappropriate. The GVRD conducts an animal faecal monitoring program in the watershed areas and requires a health certificate to control human access. This proactive approach is only feasible in a closed watershed area. Giardia is more resistant to chlorination than most biological contaminants and responds only to boiling or more sophisticated (and expensive) filtration processes. "Multiple barrier" systems of treatment, such as chlorination, followed by filtration, ozonation, and/or closed watershed programs, are the most effective means of controlling Giardia and other biological contaminants.

Cryptosporidium is another protozoa causing intestinal or enteric infection, is even smaller than Giardia, and thus more difficult to filter from water supplies. Although not currently as prevalent in British Columbia as Giardia. Cryptosporidium will likely increasing be a concern, especially for individuals with reduced resistance to disease.

5.1.3 Agriculture

Agricultural runoff, primarily from feedlots and from spraying operations, are existing or potential problems within community watersheds. Agricultural runoff from feedlots in the Williams Lake area contaminated the lake source in 1986 forcing the city to switch to a groundwater supply. Pesticide leaching from a forest nursery was a concern mentioned in the Kitimat-Stikine Regional District; the regional district has attempted to control the problem through the terms of a development permit.

5.1.4 Residential Development

Concerns regarding residential development were primarily associated with septic systems which could potentially leach into adjacent water supplies. A number of regional district staff pointed to Ministry of Crown Lands development policies as a contributing factor in this problem. According to several water managers, the ministry has recently been promoting the sale of residential lots in watersheds without due regard to water supply considerations.

5.1.5 Industry

Industrial development was not cited as an existing problem within watersheds. However, industrial development upstream of water supplies was identified as a potential issue which could become more contentious in the future.

5.1.6 Mining

From this survey, it appears that there is only one watershed currently affected by mining activity. Water quality impacts have been noted in the District of Campbell River. However, according to regional district contacts, mineral exploration or development is currently being considered in at least 6 community watersheds.

5.2 Threats to Groundwater

At the present time, groundwater contamination is generally localized. Contamination can be caused by septic field leachate from residential development (Fraser-Cheam, Okanagan-Similkameen, and Skeena-Queen Charlotte Regional Districts), by farm runoff and pesticide infiltration. Other risk factors include stormwater drainage, and leakage from underground gasoline storage tanks. Uranium contamination from naturally occuring deposits and woodwaste leachate were also cited as problems in other regional districts (Powell River, Okanagan-Similkameen). Groundwater contamination was perceived to become an increasingly important issue in the future as water managers turn to groundwater as an alternative supply to augment, or replace, existing surface water supplies.

5.3 Treatment and Infrastructure

In British Columbia, a minimum level of treatment, usually chlorination and some settling, is generally all that is required to bring water up to the standards set in the Canadian Drinking Water Quality Guidelines. A number of sources, both surface and groundwater, require no treatment at all. In British Columbia only 5 communities have water treatment facilities beyond chlorination.

5.3.1 Chlorination

Chlorination, as a purification process, has become controversial due to its potential contribution to the production of suspected carcinogens (trihalomethanes). For this and aesthetic reasons, the public has resisted the addition of chlorine to water supplies. Several communities have investigated, or are in the process of, using alternatives such as ultraviolet treatment, ozonation or chloramination (addition of ammonia, then chlorine).

5.3.2 Filtration

As mentioned previously, filtration would be required if Giardia sp. becomes an ongoing threat in community watersheds. Filtration is also required if clarity and other aesthetic properties are degraded or require correction. The filtration and treatment facility being considered by the Greater Victoria Water District to correct taste and odour problems (due to algae blooms) would cost between $80 $100 million. Although systems required by smaller communities would likely be less costly, filtration represents a significant capital investment for any community.

6.0 WATER MANAGEMENT ISSUES

The Greater Victoria Water District, and the Greater Vancouver Regional District have control over access, resource extraction, harvesting and other resource uses within their water supply areas. The City of Prince Rupert also has a closed watershed policy. Other regional districts view this type of watershed management as a model to work towards. The Regional District of Parksville is discussing the development of a similar water system for their jurisdiction. In the meantime, most regional districts and municipalities must contend with a variety of other resource uses which potentially conflict with a clean water supply.

6.1 Watershed Planning

Under the current system, watershed planning takes place under the auspices of the Water Management Branch, Ministry of Environment. The Ministry of Environment has undertaken watershed planning for the following communities:

- Revelstoke (Dolan Creek),
- Matsqui and Mission (Norrish Creek),
- Slocan (Springer Creek), and
- Clinton (Clinton Creek).

The objectives of these plans are to control sedimentation, to manage visual impacts and to maintain and protect water quality and quantities. However, the plans have a number of significant disadvantages:

- the plans are reactive and cannot restrict activities while the study is taking place,
- no policing takes place while the plan is in effect.
- no regulations or fines are imposed for non-compliance to the plan, as the plan has no legislated control,

Watershed planning requires contribution from key stakeholders, however, the plan gives them no guarantee for reparations should logging or other activities affect water quality or other watershed values. In short, the plans have no "teeth" to ensure compliance from logging companies or contractors for the protection of water quantity or quality, and therefore has little credibility within the community.

Representatives of the regional districts of Alberni-Clayoquot, Mt. Waddington, Okanagan-Similkameen, and North Okanagan were frustrated regarding the amount of effective input that they have to watershed planning. The regional districts of East Kootenay, Kootenay-Boundary, and Sunshine Coast also expressed frustration at the lack of regional control in their watersheds. The municipalities within these districts had similar concerns.

6.2 Management of Timber Harvesting

From discussions with a representative of the Alberni-Clayoquot Regional District, it appears that the district manager of the Ministry of Forests has more power over the fate of water supplies than the regional district or the municipalities who actually use the water. Paradoxically, the Ministry of Forests has no special mandate to manage water. The watershed planning process was intended to resolve some of the forestry conflicts, however, few municipalities or regional districts consider the current system to be effective.

Under the Municipal Act, regional districts have limited powers to control timber harvesting where environmentally sensitive slopes are involved. Tree cutting bylaws allow regional districts to restrict vegetation cutting on private land but local government has few powers to alter forest management activities in publicly-owned watersheds. The tree cutting bylaw in the Kootenay Boundary Regional District is only valid if there are demonstrated natural hazards that must be avoided.

6.3 Management of Recreation

Local government is concerned about management of recreation in watersheds. Barry Willoughby of the Ministry of Health stated that the closed watershed policy of some regional districts may put more recreation pressure on adjacent open watersheds. There is a need for regional cooperation in establishing recreation policies as protected watersheds generally offer landscape characteristics desired by recreationists.

6.4 Regulation and Licencing

6.4.1 Watershed and surface water

Currently, local government does not have explicit authority within watersheds to manage water quality and quantity for domestic consumption. According to Erik Karlson of the Ministry of Municipal Affairs, Recreation and Culture, legal interpretation of existing legislation indicates that any use licenced by a Crown

agency is exempt from regional or municipal control. The water users, such as regional districts, municipalities and water districts, desire an opportunity for more effective input and stronger jurisdiction over activities potentially affecting their water supplies.

6.4.2 Groundwater

Currently, British Columbia has no legislation to manage withdrawals of groundwater from aquifers. This is a concern especially in areas which are presently dependent on groundwater supplies or areas that may be more dependent on aquifers in the future. The Regional District of Parksville monitors groundwater withdrawals and aquifer pressure closely to ensure that they are not mining the aquifer. However, they have no control over private well withdrawals which may affect the same groundwater source, and they have found that communication with the Ministry of Environment regarding groundwater reserves has not allowed effective management of the aquifer.

In the Cariboo Regional District, residents have relied on the "good neighbour" policy in well drilling, ie. not placing a new well too close or deeper than an existing well so as to dry up the existing well. However, there is concern that "good neighbour" policies will breakdown where there are relatively rapid influxes of population or when competition for water becomes more fierce.

There is also a need for regulation to protect groundwater quality. Potential sources of contamination of groundwater are plentiful. Recent cases of groundwater contamination such as the Elmira, Ontario case (involving industrial dumping), and Grand Forks (involving chronic leakage from underground gasoline storage tanks) are of concern since gas stations (with underground storage) and industrial storage sites are found throughout British Columbia.

6.5 Need for Monitoring

6.5.1 Groundwater

Groundwater quality requires some wide spectrum monitoring, not only in areas where industrial and commercial development has occurred, and contamination must be guarded against, but also for newly developed water sources. Communities within the Okanagan-Similkameen and Kootenay Boundary Regional District have groundwater sources in the midst of uranium deposits, yet the Ministry of Health's limited monitoring program does not test for uranium. One community has been trying to obtain a provincial grant to finance the water quality testing required.

Regulation of groundwater withdrawals would also involve monitoring programs and ideally, more dissemination of provincial information on the extent of groundwater reserves. Several regional district staff mentioned uncertainty about groundwater reserves as a concern, and hoped for more efficient and effective communication with the Ministry of Environment (Water Management Branch) to rectify this.

6.5.2 Surface Water

The stated objective for developing watershed management plans is to preserve existing water quality and quantity. In most cases the existing conditions are not well defined, especially as they relate to the quality issue. There is a need to increase water quality monitoring within the province to track water quality for existing community watersheds and to identify other potential water supply sources. Water quality monitoring is needed to protect human health and to provide more insight regarding the impacts of human activities within watersheds.

6.6 Funding

The province has an incentive program for encouraging operators of rural residential and private utilities to sign over water management to either a municipality or a regional district. Under this program, grants for cost-sharing were originally structured so that the province paid for 75% of projects, and the local government agency paid for 25%. The cost-sharing structure has recently changed to a 50:50 arrangement, and hence, it has become less attractive for local government to take over private water systems. Several regional districts have expressed reluctance in assuming responsibility for poorly maintained systems.

6.7 Role of Education

In the future, protection of drinking water supplies must take a higher profile both in the planning process and in the public's awareness. Water must become the first priority in integrated watershed management. The public needs to be educated on the value of the water supply and the potential impacts of human activity on that water supply:

- through signs and interpretive program at watershed boundaries and access points and within the watersheds,
- through community outreach programs emphasizing the quality of our water sources and how the public can act to protect the water supply.

There is also a need to educate the public regarding demand side management issues which impact on both the environmental and economic aspects of domestic water supply. The public needs to know that water in this province, while a plentiful resource, is finite, and requires management as such.

7.0 SUMMARY

British Columbia is blessed with an abundant supply of good quality water. Several regional district and municipal contacts stated with pride that the supply of water locally was the "best in B.C." both in terms of quality and quantity. In many areas of the province treatment is not required to meet Canadian drinking water quality guidelines and chlorination provides the level of protection required by the Ministry of Health. Water supply in most areas is adequate to sustain foreseeable urban growth. Exceptions include the Gulf Islands, and areas in the Peace River and Nanaimo Regional Districts.

Although this paper is not intended to identify site-specific issues, there are concerns about municipal water supply which must be addressed in the context of sustainable development. By definition, a policy for sustainable development must address the basic question of resource use. Is utilization of resources and the environment today damaging the prospects for their use by future generations?

Today, in most parts of the province, consumers expect water for domestic use to be safe, and abundant. Water managers have expressed concern about the prospects for the future which relate to activities of today and those activities already planned for tomorrow. The major concerns are:

- lack of protection of water quality for water supply sources,
- ineffective management of potentially conflicting land use within water supply areas,
- high cost of providing treatment or developing new sources where natural water quality is degraded,
- inability to secure water supply sources for future demand (this concern is primarily related to groundwater which is currently not licenced by the province),
- lack of demand side management and the need for education regarding the economic and environmental impacts of excessive water consumption,
- high cost of replacing or upgrading water distribution systems, and
- the need for effective monitoring to identify potential problems and to develop a proactive management approach to municipal water supply issues.